CIVIL AIM CONSULTANTS & ENGINEERS

(Building Geo-Tech & Highway Materials Testing Laboratory)

An ISO 9001-2015 Certified Company

NABL Accredited As Per ISO/IEC 17025:2017 Laboratory

JobNo: CACE/BBMP/SN/W.No.14/2022-23 Date : 18.07.2022

TEST RESULTS OF AGGREGATE IMPACT VALUE

Client : **Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**

Agency : **Sri.Shivananda N, Contractor, Bangalore.**

Name of work : Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.

Source / Location : Hot Mix Plant, Bangalore

BIS Code : IS 2386 Part (4):1963

Type of Mix : Dense Graded Bituminous Macadam

Date of test : 18.07.2022

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W1 g	382	384	
2	Weight of agregate passing 2.36 mm sieve after the test = W2 g	86	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W3 g	296	296	
5	Aggregate Impact value = percent fines	22.51	22.92	**22.71**
	100* (W2/W1) percent			

Comments:

→ Maximum allowable Aggregate Impact value for Dense Graded Bituminous Macadam is 27% (Table 500-8 of MORTH specification)

Assistant Executive Engineer
T. Dasarahalli Sub Division
Bagalagunte, BBMP
Bangalore-560073

Note:

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Authorised Signatory

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Job No: CACE/BBMP/SN/W.No.14/2022-23 Date: **18.07.2022**

TEST REPORT ON PAVING BITUMEN

Client	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Sri.Shivananda N,** Contractor, Bangalore.
Name of work	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
BIS Code	IS 73:2013,IS 1203:1978, IS 1208:1978, IS 1205:1978, IS1448(P-69):1969
Date of Testing	**18.07.2022**
Type of Mix	**Dense Graded Bituminous Macadam , VG 30**
Source of Location	**Hot Mix Plant**

The results of the tests conducted on the bitumen sample using for Dense Graded Bituminous Macadam

Sl.No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 0C, 100gms, 5sec, 1/10 mm	50	Min 45
2	Softening point, 0C	48	Min 47
3	Ductility at 250C, cm	>98	Min40
4	Flash Point, 0C	281	Min 220

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Job No.: CACE/BBMP/SN/W.No.14/2022-23

Date: 20.07.2022

Specific Gravity And Water Absorption Test

Client	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	**Sri.Shivananda N, Contractor, Bangalore.**
Name of the Work	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
BIS Code	IS 2386(Part 3):1963
Type of Mix	Dense Graded Bituminous Macadam
Date of Testing	18.07.2022 to 20.07.2022

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2022	2024	2025	
2	Weight of basket suspended in water	W_2 g	758	755	757	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1264	1269	1268	
4	Weight of saturated surface dry aggregate in air	W_3 g	2018	2017	2016	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	754	748	748	
6	Weight of oven dried aggregate	W_4 g	2007	2007	2005	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.662	2.683	2.680	2.675
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.701	2.720	2.720	2.714
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.55%	0.50%	0.55%	0.53%

Comments:

→ Maximum allowable Aggregate Water absorption value for Dense Graded Bituminous Macadam is 2.0%(As per MORTH table 500.8)

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Job No.: CACE/BBMP/SN/W.No.14/2022-23 Date: 21.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri.Shivananda N,** Contractor, Bangalore.
Name of the Work	:	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	21.07.2022

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.36	10.27	9 Kn (min)
2	Marshal flow, mm	3.79	3.65	2 – 4
3	Percent air voids in Mineral Aggregate	13.48	14.54	13 – 15
4	Voids in Compacted Mix	3.69	4.41	3 – 6
5	Percent Voids filled with Bitumen	69.96	69.26	65 - 75
6	Density, g/cc	2.25	2.23	--

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Job No.: CACE/BBMP/SN/W.No.14/2022-23 Date: 21.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri.Shivananda N,** Contractor, Bangalore.
Name of the Work	:	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	21.07.2022

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.23	10.10	9 Kn (min)
2	Marshal flow, mm	3.66	3.79	2 – 4
3	Percent air voids in Mineral Aggregate	13.77	14.33	13 – 15
4	Voids in Compacted Mix	3.82	4.24	3 – 6
5	Percent Voids filled with Bitumen	68.89	69.55	65 - 75
6	Density, g/cc	2.23	2.27	--

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Job No.: CACE/BBMP/SN/W.No.14/2022-23 Date: 22.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri.Shivananda N,** Contractor, Bangalore.
Name of the Work	:	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	22.07.2022

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.40	10.21	9 Kn (min)
2	Marshal flow, mm	3.78	3.81	2 – 4
3	Percent air voids in Mineral Aggregate	13.89	14.45	13 – 15
4	Voids in Compacted Mix	3.94	4.36	3 – 6
5	Percent Voids filled with Bitumen	69.1	69.65	65 - 75
6	Density, g/cc	2.24	2.25	--

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TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri.Shivananda N,** Contractor, Bangalore.
Name of the Work	:	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	22.07.2022

The results of the tests conducted on the Dense Graded Bituminous Macadam mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.46	10.43	9 Kn (min)
2	Marshal flow, mm	3.85	3.82	2 – 4
3	Percent air voids in Mineral Aggregate	13.95	14.75	13 – 15
4	Voids in Compacted Mix	3.72	4.65	3 – 6
5	Percent Voids filled with Bitumen	68.66	69.77	65 - 75
6	Density, g/cc	2.25	2.27	--

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Date: 21.07.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX AASHTO T 164 & AASHTO T 30

Client	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	**Sri.Shivananda N, Contractor, Bangalore.**
Name of the Work	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Date of Testing	21.07.2022

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477	477
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	23.00	23.00
7. Bitumen content in %	4.60	4.60
8. Average	**4.60**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	35.9	35.9	7.5	92.5	90 - 100
19	72.9	108.8	22.8	77.2	71 - 95
13.2	66.8	175.6	36.8	63.2	56 - 80
4.75	83.8	259.4	54.4	45.6	38 - 54
2.360	76.5	335.9	70.4	29.6	28 - 42
0.300	96.2	432.1	90.6	9.4	7 - 21
0.075	21.2	453.3	95.0	5.0	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	36.6	36.6	7.7	92.3	90 - 100
19	73.2	109.8	23.0	77.0	71 - 95
13.2	66.1	175.9	36.9	63.1	56 - 80
4.75	83.50	259.4	54.4	45.6	38 - 54
2.360	78.2	337.6	70.8	29.2	28 - 42
0.300	91.2	428.8	89.9	10.1	7 - 21
0.075	21.2	450	94.3	5.7	2 - 8

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Date: 21.07.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX AASHTO T 164 & AASHTO T 30

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri.Shivananda N, Contractor, Bangalore.
Name of the Work	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Date of Testing	21.07.2022

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477.5	477.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	22.50	22.50
7. Bitumen content in %	4.50	4.50
8. Average	4.50	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.10
37.5	0	0	0	100	100
26.5	34.4	34.4	7.2	92.8	90 - 100
19	73.9	108.3	22.7	77.3	71 - 95
13.2	66	174.3	36.5	63.5	56 - 80
4.75	84	258.3	54.1	45.9	38 - 54
2.360	76	334.3	70.0	30.0	28 - 42
0.300	96.8	431.1	90.3	9.7	7 - 21
0.075	21.6	452.7	94.8	5.2	2 - 8

SIEVE SIZE	Test 2				
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.10
37.5	0	0	0	100	100
26.5	36.5	36.5	7.6	92.4	90 - 100
19	73.4	109.9	23.0	77.0	71 - 95
13.2	66.8	176.7	37.0	63.0	56 - 80
4.75	84.50	261.2	54.7	45.3	38 - 54
2.360	78.6	339.8	71.2	28.8	28 - 42
0.300	98.5	438.3	91.8	8.2	7 - 21
0.075	23.4	461.7	96.7	3.3	2 - 8

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BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX

AASHTO T 164 & AASHTO T 30

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri.Shivananda N, Contractor, Bangalore.
Name of the Work	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Date of Testing	22.07.2022

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	476.5	477
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	23.50	23.00
7. Bitumen content in %	4.70	4.60
8. Average	4.65	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	36.2	36.2	7.6	92.4	90 - 100
19	72.5	108.7	22.8	77.2	71 - 95
13.2	65.2	173.9	36.5	63.5	56 - 80
4.75	83.2	257.1	54.0	46.0	38 - 54
2.360	75.2	332.3	69.7	30.3	28 - 42
0.300	96.1	428.4	89.9	10.1	7 - 21
0.075	21.9	450.3	94.5	5.5	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	36.6	36.6	7.7	92.3	90 - 100
19	73.2	109.8	23.0	77.0	71 - 95
13.2	66.1	175.9	36.9	63.1	56 - 80
4.75	84.40	260.3	54.6	45.4	38 - 54
2.360	78.8	339.1	71.1	28.9	28 - 42
0.300	98.8	437.9	91.8	8.2	7 - 21
0.075	23.1	461	96.6	3.4	2 - 8

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Date: 22.07.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE GRADED BITUMINOUS MACADAM MIX AASHTO T 164 & AASHTO T 30

Client	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
Agency	Sri.Shivananda N, Contractor, Bangalore.
Name of the Work	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Date of Testing	22.07.2022

BITUMEN CONTENT DETERMINATION

Description	Test 1	Test 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477.5	477
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	22.50	23.00
7. Bitumen content in %	4.50	4.60
8. Average	4.55	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Test 1				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	34.4	34.4	7.2	92.8	90 - 100
19	74.9	109.3	22.9	77.1	71 - 95
13.2	66.9	176.2	36.9	63.1	56 - 80
4.75	84.6	260.8	54.6	45.4	38 - 54
2.360	76.5	337.3	70.6	29.4	28 - 42
0.300	96.9	434.2	90.9	9.1	7 - 21
0.075	21.9	456.1	95.5	4.5	2 - 8

SIEVE SIZE	Test 2				Requirement as per MORTH table 500.10
mm	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
37.5	0	0	0	100	100
26.5	36.5	36.5	7.7	92.3	90 - 100
19	73.4	109.9	23.0	77.0	71 - 95
13.2	66.8	176.7	37.0	63.0	56 - 80
4.75	84.50	261.2	54.8	45.2	38 - 54
2.360	78.6	339.8	71.2	28.8	28 - 42
0.300	98.5	438.3	91.9	8.1	7 - 21
0.075	23.4	461.7	96.8	3.2	2 - 8

Assistant Executive Engineer
T. Dasarahalli Sub Division
Bagalagunte, BBMP
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22.7.22

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For CIVIL AIM CONSULTANTS & ENGINEERS

Authorised Signatory

No. 01, Satvika Nilaya, Opp. Widia Poorna Prajna School,
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Job No.: CACE/BBMP/SN/W.No.14/2022-23 Date: 19.07.2022

Aggregate Impact Value

Client	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	**Sri.Shivananda N, Contractor, Bangalore.**
Name of the Work	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
BIS Code	IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	19.07.2022

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	83.5	84.5	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	296.5	298.5	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	21.97	22.06	**22.02**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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Assistant Executive Engineer
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Job No.: CACE/BBMP/SBR/W.No.64/2022-23

Date : 19.07.2022

Aggregate Gradation Test

IS : 2386 Part I

Client	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	**Sri.Shivananda N, Contractor, Bangalore.**
Name of the Work	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
BIS Code	IS 2386(Part 1):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	19.07.2022

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	417	8.34	8.34	91.66	90 - 100	
9.5	481	9.62	17.96	82.04	70 - 88	
4.75	645	12.90	30.86	69.14	53 - 71	
2.36	685	13.70	44.56	55.44	42 - 58	
1.18	519	10.38	54.94	45.06	34 - 48	
0.600	545	10.90	65.84	34.16	26 - 38	
0.300	489	9.78	75.62	24.38	18 - 28	
0.150	365	7.30	82.92	17.08	12 - 20	
0.075	490	9.80	92.72	7.28	4 - 10	

Total Weight of Sample: **5000** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	419	8.38	8.38	91.62	90 - 100	
9.5	551	11.02	19.40	80.60	70 - 88	
4.75	685	13.70	33.10	66.90	53 - 71	
2.36	535	10.70	43.80	56.20	42 - 58	
1.18	561	11.22	55.02	44.98	34 - 48	
0.600	541	10.82	65.84	34.16	26 - 38	
0.300	680	13.60	79.44	20.56	18 - 28	
0.150	196	3.92	83.36	16.64	12 - 20	
0.075	480	9.60	92.96	7.04	4 - 10	

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Executive Engineer

Assistant Executive Engineer
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Job No.: CACE/BBMP/SN/W.No.14/2022-23

Date: **19.07.2022**

TEST REPORT

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri.Shivananda N,** Contractor, Bangalore.
Name of the work	:	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
IS Code	:	IS 73:2013, IS 1203:1978(RA 2008), IS 1205:1978(RA 2009), IS 1208:1978(RA 2009), IS 1209:1978(RA 2009)
Source of location	:	Hot mix Plant, Bangalore, VG 30
Date of testing	:	**19.07.2022**

The results of the tests conducted on the bitumen sample using for Bituminous Concrete

Sl. No	Description	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	50	Min 45
2	Softening point, ^{0}C	51	Min. 47
3	Ductility at 27^{0}C, cm	> 101	Min. 40
4	Flash Point, ^{0}C	271	Min. 220

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Job No.: CACE/BBMP/SN/W.No.14/2022-23

Date : 19.07.2022

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	**Sri.Shivananda N, Contractor, Bangalore.**
Name of Work	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	19.07.2022

Sl no	Test	1	2	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	12.5	12.8	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	13.1	12.9	
	Combined Flakiness & Elongation index	25.60	25.70	

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Job No.: CACE/BBMP/SN/W.No.14/2022-23 Date : 21.07.2022

Specific Gravity And Water Absorption Test

Client	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
Agency	**Sri.Shivananda N, Contractor, Bangalore.**
Name of the Work	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
BIS Code	IS 2386(Part 3):1963
Type of Mix	Bituminous Concrete
Date of Testing	19.07.2022 to 21.07.2022

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2022	2023	2026	
2	Weight of basket suspended in water	W_2 g	753	755	756	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1269	1268	1270	
4	Weight of saturated surface dry aggregate in air	W_3 g	2016	2018	2020	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	747	750	750	
6	Weight of oven dried aggregate	W_4 g	2010	2011	2012	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.691	2.681	2.683	2.685
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.713	2.707	2.712	2.710
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.30%	0.35%	0.40%	0.35%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%(MORTH table 500.16)

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Job No.: CACE/BBMP/SN/W.No.14/2022-23

Date: 23.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri.Shivananda N,** Contractor, Bangalore.
Name of the Work	:	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	23.07.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	10.25	9.58	9 Kn (min)
2	Marshal flow, mm	3.67	2.45	2 – 4
3	Percent air voids in Mineral Aggregate	13.46	14.52	13 – 15
4	Voids in Compacted Mix	3.78	4.61	3 – 6
5	Percent Voids filled with Bitumen	70.12	71.15	65 - 75
6	Density, g/cc	2.25	2.26	--

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Job No.: CACE/BBMP/SN/W.No.14/2022-23

Date: 23.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri.Shivananda N,** Contractor, Bangalore.
Name of the Work	:	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	23.07.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.44	10.82	9 Kn (min)
2	Marshal flow, mm	2.69	2.65	2 – 4
3	Percent air voids in Mineral Aggregate	13.45	14.52	13 – 15
4	Voids in Compacted Mix	3.84	4.15	3 – 6
5	Percent Voids filled with Bitumen	69.29	70.12	65 - 75
6	Density, g/cc	2.25	2.26	--

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Job No.: CACE/BBMP/SN/W.No.14/2022-23

Date: 23.07.2022

TEST REPORT ON STABILITY OF MIX

Client	:	**Assistant Executive Engineer,** Dasarahalli Sub Division, BBMP, Bangalore.
Agency	:	**Sri.Shivananda N,** Contractor, Bangalore.
Name of the Work	:	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	23.07.2022

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.63	10.87	9 Kn (min)
2	Marshal flow, mm	2.79	2.96	2 – 4
3	Percent air voids in Mineral Aggregate	13.62	14.57	13 – 15
4	Voids in Compacted Mix	3.83	4.20	3 – 6
5	Percent Voids filled with Bitumen	69.43	70.17	65 - 75
6	Density, g/cc	2.25	2.26	--

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Job No.: CACE/BBMP/SN/W.No.14/2022-23 Date : 23.07.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	**Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.**
AGENCY	**Sri.Shivananda N, Contractor, Bangalore.**
NAME OF THE WORK	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	23.07.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	469	469.5
3. Weight of Asphalt and Mineral matter Extracted, g	31	30.5
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	31	30.5
7. Bitumen content in %	6.20	6.10
8. Average	6.15	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1				Requirement as per MORTH table 500.17
	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	13.2	13.2	2.8	97.2	90 - 100
9.5	69.1	82.3	17.5	82.5	70 - 88
4.75	92.2	174.5	37.2	62.8	53 - 71
2.36	42.2	216.7	46.2	53.8	42 - 58
1.18	36.6	253.3	54.0	46.0	34 - 48
0.600	50	303.3	64.7	35.3	26 - 38
0.300	46.6	349.9	74.6	25.4	18 - 28
0.150	35.5	385.4	82.2	17.8	12 - 20
0.075	46.5	431.9	92.1	7.9	4 - 10

SIEVE SIZE mm	Test 2				Requirement as per MORTH table 500.17
	Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	14.4	14.4	3.1	96.9	90 - 100
9.5	62.2	76.6	16.3	83.7	70 - 88
4.75	89.9	166.5	35.5	64.5	53 - 71
2.36	46.5	213	45.4	54.6	42 - 58
1.18	43.5	256.5	54.6	45.4	34 - 48
0.600	52.2	308.7	65.8	34.2	26 - 38
0.300	49.9	358.6	76.4	23.6	18 - 28
0.150	35.5	394.1	83.9	16.1	12 - 20
0.075	40.2	434.3	92.5	7.5	4 - 10

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	Sri.Shivananda N, Contractor, Bangalore.
NAME OF THE WORK	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	23.07.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	470	469.5
3. Weight of Asphalt and Mineral matter Extracted, g	30	30.5
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	30	30.5
7. Bitumen content in %	6.00	6.10
8. Average	6.05	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	13.7	13.7	2.9	97.1	90 - 100
9.5	64.9	78.6	16.7	83.3	70 - 88
4.75	91.3	169.9	36.1	63.9	53 - 71
2.36	48.2	218.1	46.4	53.6	42 - 58
1.18	36.8	254.9	54.2	45.8	34 - 48
0.600	57.6	312.5	66.5	33.5	26 - 38
0.300	43.3	355.8	75.7	24.3	18 - 28
0.150	35.9	391.7	83.3	16.7	12 - 20
0.075	40.1	431.8	91.9	8.1	4 - 10

SIEVE SIZE mm	Test 2 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	13.9	13.9	3.0	97.0	90 - 100
9.5	65.2	79.1	16.8	83.2	70 - 88
4.75	92.1	171.2	36.5	63.5	53 - 71
2.36	45.1	216.3	46.1	53.9	42 - 58
1.18	48.9	265.2	56.5	43.5	34 - 48
0.600	56	321.2	68.4	31.6	26 - 38
0.300	44.8	366	78.0	22.0	18 - 28
0.150	37.1	403.1	85.9	14.1	12 - 20
0.075	31.6	434.7	92.6	7.4	4 - 10

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Job No.: CACE/BBMP/SN/W.No.14/2022-23 Date : 23.07.2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

AASHTO T 164 & AASHTO T 30

CLIENT	Assistant Executive Engineer, Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	Sri.Shivananda N, Contractor, Bangalore.
NAME OF THE WORK	Comprehensive Development works in Ward No.14,Dasarahalli Sub division,BBMP,Bangalore.
SAMPLE ID	Hot Mix Plant, Bangalore
DATE OF TESTING	23.07.2022

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	469.5	469.5
3. Weight of Asphalt and Mineral matter Extracted, g	30.5	30.5
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	30.5	30.5
7. Bitumen content in %	6.10	6.10
8. Average	6.10	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	14.6	14.6	3.1	96.9	90 - 100
9.5	66.3	80.9	17.2	82.8	70 - 88
4.75	89.4	170.3	36.3	63.7	53 - 71
2.36	45	215.3	45.9	54.1	42 - 58
1.18	35.8	251.1	53.5	46.5	34 - 48
0.600	54.3	305.4	65.0	35.0	26 - 38
0.300	41.8	347.2	74.0	26.0	18 - 28
0.150	35.3	382.5	81.5	18.5	12 - 20
0.075	41.2	423.7	90.2	9.8	4 - 10

SIEVE SIZE mm	Test 2 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	14.9	14.9	3.2	96.8	90 - 100
9.5	66.2	81.1	17.3	82.7	70 - 88
4.75	92.8	173.9	37.0	63.0	53 - 71
2.36	45.3	219.2	46.7	53.3	42 - 58
1.18	48.2	267.4	57.0	43.0	34 - 48
0.600	56.3	323.7	68.9	31.1	26 - 38
0.300	45.8	369.5	78.7	21.3	18 - 28
0.150	37.9	407.4	86.8	13.2	12 - 20
0.075	32.6	440	93.7	6.3	4 - 10

Note:

1) This test report should not be reproduced except in full, without written approval of the laboratory.
2) The results indicated above are based on the tests carried out on the samples collected at the site.
3) Any Query regarding the report must be reported within [illegible] from the date of testing.

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